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TWIN CITIES

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TO: Kent Crookston

FROM: Orvin Burnside *Orvin Burnside*

RE: Conference on Sustainable Agriculture, Omaha, NE, March 8-10, 1989

This conference was well attended as 359 had already registered by Wednesday evening. I was the only representative from the University of Minnesota. It was an excellent forum for an interchange of information from a very diverse group of agriculturalists. There is considerable antagonism and disenchantment with the name LISA (Low Input Sustainable Agriculture) because the commercial agricultural interests feel threatened or disenfranchised. This hostility became more and more apparent as the conference progressed. The four farmers selected to make presentations were all organic farmers. Several questions came up as to whether these farmers could profitably compete if they would not receive a 30 to 50% subsidy for their crop products. All four farmers responded that they could be profitable without the subsidy but they certainly were not going to reject the subsidy.

A problem I have with this entire area is that as more and more farmers produce organic foods their market will be saturated and one way they have to increase their market share is to instill fear within the general public as to the safety of the food they eat. We have seen what can be done with this approach the past several weeks as we have witnessed the hatchet job that has been done on the safety of apples and grapes. I even find myself cutting out the end cores of an apple even though I am convinced that the food we produce nowadays is the most wholesome and nutritious that the world has ever known. I have real problems with non-toxicologists telling me that our food is unfit for human consumption.

There was considerable emphasis during the last day that our agriculture must be profitable and competitive. The United States cannot have a viable agriculture if we do not pay attention to profitability. It was pointed out that conventional and organic farmers both farm our government programs. We in agriculture should not become impatient because major changes such as sustainable agriculture will not occur rapidly. It was mentioned a number of times that our universities must become involved in sustainable agriculture research, extension, and teaching if this concept is to come to fruition. Overall it was a worthwhile conference that brought together individuals of very diverse backgrounds and opinions and allowed them the opportunity to discuss the future of agriculture.

xc: Gene Allen  
Wally Nelson  
Extension Specialists  
Weed Scientists

Enclosure: one

Omaha, NE - The Promise of Low-input Agriculture  
A Search for Sustainability and Profitability  
March 8-10, 1989

359 Registered for the Meeting

MARCH 9, 1989

Neil Schuller

No definition of low-input, sustainable agriculture available.  
Possible definitions would be:

- a. Organic farming: A production system which avoids or largely excludes the use of synthetically compounded fertilizer...
- b. Sustainable Agriculture (Leopold Center definition): The appropriate use of crop and livestock systems and agriculture inputs supporting those activities which maintain economic and social viability while preserving the high productivity and quality of Iowa's land.
- c. Low-input Agriculture Systems: Systems that attempt to use off-farm purchased inputs most efficiently and effectively minimize adverse impacts of the farming system on the environment and on the health of producers as well as consumers, and enhance farm profitability while sustaining the natural resources on which agriculture depends.
- d. Sustainable Agriculture (ASA): Sustainable Agriculture is one that, over the long term, enhances environmental quality and the resource base on which agriculture depends, provides for basic human food and fiber needs, is economically viable, and enhances the quality of life for farmers and society as a whole.
- e. Sustainable Agriculture:
 

(Ends)	Productive and profitable farmer Soil and water conservation Environmental quality Food safety and quality
(Means)	Reduced use of purchased inputs Rotations Conservation Practices Diversification Mechanical cultivation Biological pest controls

Conservation implies that agriculture is compatible with nature.

Conservation tillage requires increased use of herbicides and that causes conflicts with some people.

Conservationists may feel uncomfortable with LISA.

Will low-impact sustainable farming become main stream agriculture?

Removal of barrier, financial incentives, facts and information, Exp. Stn. must do more research in this area

Myths and Reality =

Many think LISA will never be profitable - many disagree (must add in other benefits)

Livestock is not a prerequisite for LISA

Farm programs - (eg. basic acreage or program requirements) penalize LISA



Farming with fewer chemicals is foreign to many farmers (how can they object to this change in outlook?)  
 Incentives and regulations - Do we need incentives to level the playing field?  
 We subsidize conventional agriculture so should we subsidize LISA?  
 Is profitability in conflict with LISA? Some say yes others no. The only Sustainable Agriculture is Profitable Agriculture. In the past we have always rewarded higher yields in Agriculture. Sustainable Agriculture is an ideal that we must handle with care, and we have.

### Fee E. Busby: A Challenge to Agencies for Leadership

Leadership with Strategies for taking Charge (Book title) Everyone agrees that there is less leadership nowadays than in the past? (Basic concept of the book)

We are faced with insurmountable opportunity - Page

Need a paradigm shift if we are to succeed

In the past man was dominate over nature, big is better, taming of land and water and animals was expected, greater use of chemicals, fencerow to fencerow farming, etc.

Rain forests in Brazil are being destroyed because poor people are attempting to survive. Many poor people make poor conservationists.

We must realize that man is dominated by nature - not vice versa. We should not be in a hurry to utilize every innovation man develops because we must recognize what effect these have on nature (eg. greenhouse effect, ozone layer, etc.)

Paradigm shift: Peters and Waters - In Search of Excellence. Ten ways companies search for excellence. Shared vision or culture is essential.

John Nasbit - Megatrends. Moving from a technological to a sustainable agriculture.

Challenge to agencies, farmers, etc. Look at the world not as it is but as you hope it can be. Farm partnership to accomplish sustainable agriculture. The challenge is vision.

### Low - Input Agriculture Works: A Farmer Panel

#### 1. Jim Bender - Weeping Water, NE

The only argument against organic sustainable agriculture is that it won't work. Challenge was to farm well without pesticides and certain fertilizer while conserving the soil. Installed terraces, farmed on contours, eliminated fall tillage, goal not to use chemicals was difficult, livestock was essential. By 1970 it was free of insecticides, by 1980 the farm was free of herbicides, anhydrous fertilizer was the first fertilizer to go, free of commercial fertilizer by 1987. No help from the University or farmer neighbors, had to do his own research. what would have happened to LISA if it had even a fraction of the attention of the AES and ES? Eliminating herbicides was the most difficult and Jim's desired weed control equal to that of his neighbors who use herbicides, while controlling shattercrop and hemp dogbane. The farm is not a museum piece for old equipment - modern equipment is used. Insects have not been a problem.

LISA reminds a Successful Farmer editor of his grandmother - work, work, work and save, save, save. Nice lady but not one you would want to marry. In reality - all that remains for LISA is widespread adoption.

#### 2. Frederick Kirschenmann, Windsor, ND

President of North Plains Sustainable Agriculture Society. MA and Ph.D. from the University of Chicago. Now a farmer.

There are too many definitions of sustainable agriculture.



The only sustainable system is the natural prairie. As soon as we add agricultural inputs we change this system. Thus we talk about various systems some of which are more sustainable than others. Sustainability has more to do with goals rather than standards.

He want to talk about a farm that he hopes is moving toward sustainable.

Why did you change to LISA? For Fred it was conserving the soil and avoiding compaction problems. The more they used standard practices the more dependent they became on pesticides.

What causes you to continue LISA practices? Less problems and worries about human and environmental hazards. Also it gives Fred more financial flexibility, but it may not be cheaper. It's a system of maintenance inputs not production inputs. Fewer product costs in the spring. It spreads out the workload. Huge workload during planting and harvesting with conventional farming system.

### 3A Farming - April, August and Arizona

Diverse systems are more stable. Soil structure and soil tilth continues to improve under LISA. Crop rotations are extremely important. Symbiotic relationships are cheap - Feed is fed to livestock and manure is returned to the farm. Organic crops command a premium price.

How can we encourage LISA systems? We need 40 years of research and technology transfer to catch up with conventional farming. Lack of information is the main barrier, and peer pressure is the second biggest problem with adaption. Information needs to come from the ES, because of their credibility. We need policy changes in government. Base acres and input systems must be changed. Stop subsidizing conventional agriculture. Tax inputs that are environmentally degrading. Now we are deferring these costs and we don't have a level playing field.

### 3. Glenn Spray, Mt. Vernon, Ohio.

Began farming over 30 years ago, certified organic grower.

Often accused of spraying and spreading fertilizer at night.

Will present some facts and also some personal opinions so you must sort out which is which. Have not used pesticides or commercial fertilizer for 17 years.

Originally wiped out quackgrass with atrazine but fall panicum took over and found they were on a chemical treadmill.

Changed farming procedures all at once. Used a four year rotation. Corn-soybean-small grains-hay. Have used a few specialty crops: eg. white wheat, adzuki beans, tomatoes and cabbage (tomatoes got weedy). They have parked their plow - rather they use an offset disk. Harrow rotary hoe, and cultivation. Avoid the plow and use shallow tillage. "Life" in the soil is input-aerobic bacteria is very important. (i.e. - fencepost, rot off right at the soil surface or top 2 inches). Corn stalks plowed under have to be broken down by anaerobic bacteria (so don't do it). Glenn uses pectic bacteria (about 40 strains of bacteria) from California. Use legumes which fix nitrogen. Earthworms are essential (12 to 14/ft<sup>2</sup> are needed). They deposit 20 to 50 tons of earthworm castings per acre and these castings are much higher in available fertilizer nutrients.

Get OM through the hay crops and livestock manure.

How do you control weeds? Do less to cause weeds. Rotation controls weeds. Use bacterial product for 1 to 4 years in the fall. Till twice in the fall, do not till in the spring until soil is dry, till shallowly to encourage several crops of weed growth, delay planting to kill off weeds, normally plant May 15, till with spike tooth harrow-rotary hoe-cultivate. Corn is very clean of weeds. Hand remove weed escapes. You can be profitable farming organically - get a 30 to 50% premium for organic food.

The market for organic food is there.

Extra trips over the field amount to about \$10/acre.



4. Ed Sills, Pleasant Grove, California. 20 miles from Sacramento  
B.S. degree in Forestry. 1400 acres in rice, popcorn, wheat, oats, almonds, etc.  
Reasons for the change to LISA. Main reason for change was frustration with increased weed control costs. Also, chemicals were not giving satisfactory control. Pressure to reduce farm subsidies was also a reason to change farming systems. Increasing farm exports was not a reality so farming had to change. Rotate with rice and vetch. Incorporation of all crop residues. Creation of an ecological balance was another objective. Often by stopping certain production practices you eliminate some product problems. IPM and sustainable inputs are some examples of recent changes in agriculture. Some varieties require increased product inputs, which lowers profitability in some cases. Biological environment has evolved over millions of years. Crop Production systems are used for one short period and they disrupt natural systems. We need to run the race (produce crops) but not pollute or destroy our natural resources.

### Questions

1. Could you farm profitably without premiums for organic food?  
Get about a 15% premium in the long pull and that helps. We can farm competitively with the conventional farmer because our purchased inputs are less but we will not pass up premium prices. One farmer said he did not need the premiums.
2. What production costs have increased due to LISA systems?  
It takes greater management costs and labor costs and you are growing lower value crops.  
System may be just slightly less costly but risks are spread out.  
Increased costs - more trips across the field (eg. more cultivations) and more labor needed during hayings.  
Rotations bring in less income per year than continuous rice, but this balances out because of reduced production costs.  
Labor costs are greater, for example, weed control costs are greater than neighbors during wet years but less during dry years.
3. How does participation in farm programs affect their operation?  
Use set aside in rice acreage which facilitates LISA systems.  
Had to give up 40% of their wheat and oat base when they went into the system.  
Set aside program allows a farmer to establish legumes.  
Farm payments are minimal but still use set-aside acres.
4. Is livestock indispensable to LISA production systems?  
Recycling of crop nutrients is important, use of forages, can put certain crops into grass waterways, and it provides diversification of farm income.
5. GATT will not eliminate farm subsidies so what should we do with LISA?  
Leave farmers a greater degree of choice. Retarget some of the farm program benefits to more soil conserving benefits.

### Social and Economic Impacts of LISA

Patrick Madden - LISA program in California

Sustainable Agriculture: to develop and promote agriculture systems that combine responsible...

LISA: We need to feed the crop and manage the pesticides by mechanical, cultural, chemical and biological methods.

### The State of Low-Input Agriculture Research

**Dennis R. Kenney:** Director of the Leopold Center for Sustainable Agriculture. No building and no staff yet.

What do the chemical interests think of the Center? They are worried about whether this is an all or nothing concept.

### Water Quality

**Robert Barless,** EPA, Office of Groundwater Protection

**Paul O'Connell** - CSRS

LISA - Takes a hard look at present agriculture, look for cropping opportunities.

Changing Farming Practices - Use more internal rather than external resources.

Farmers are looking for information to reduce costs, control erosion and to abate pollution.

Agriculture Fish and Forestry Products, Export-Import difference 1981 - \$23, 1984 - \$11, and 1989 - \$4 billion.

1988 funded projects - Applied Production Systems, role of cereal grain cover crops in N<sub>2</sub> management, comparison of cropping systems with conservation and reduced tillage, whole farm production systems, integration of cons. tillage..., substituting legumes... 53 projects funded in 1988. All required matching funds.

Economists aren't jumping on LISA analysis because they reason that if these systems were economical they would be well under way at the present time.

### Impediments to Adoption

1. Nomenclature. Farmers don't understand what it means.
2. Loss of chemicals - turning back clock.
3. We have the most sustainable agriculture right now so why try to improve it?  
Response - "petroleum reserves are running out and we are poisoning ourselves". We can make pesticides out of crop oils so why should we worry about the loss of petroleum? Right now we have used one-half of the world's petroleum and we can't continue to do so. The biggest impediment to change is the fear of change.

Sustainable agriculture definition = prudent use of chemicals and the land to maintain a profitable agriculture without messing up the environment.

Information transfer system is not working.

Sustainable farmers are interested in the least toxic crop production options.

Conflict between having scientists do the research or having farmers do the research.

LISA program has gotten a lot of farmers and researchers working together. Also, only 15% of good proposals are funded.

LISA is not the best name as low input should be dropped. It is not low input as certainly labor and management needs increase.

Are the AES going to be drug into the 20th century (LISA) or are they going to lead us?

Conventional farmers are the greatest impediment to getting LISA adopted.

Someone said why aren't the chemical companies represented and found out that they are very much represented.

LISA is a concept that will be accepted but don't lose patience, as innovation doesn't occur without some impediments.

How do farmers learn about new innovations: Farmers learn as much from other farmers as they do from chemical and fertilizer companies. Therefore we must all start talking to one another.



GENERAL SESSIONMARCH 10, 1989**A. Raph Rossre - Impediments to adoption of LISA**

1. Education and the knowledge vacuum  
 Research institutions were not conducting the research needed.  
 Publish or Perish was inhibiting cooperative research?  
 Undue influence of industry on AES research.  
 Information comes down to the farmer and not enough going back.  
 Farmers get their information first from other farmers, salesmen, and the ES - thus we need more "on farm" research.  
 Farmers don't understand the issues.  
 Confusion over LISA definition.  
 Farmers don't appreciate the change that is coming.  
 Farmers fear that LISA means no chemicals or fertilizer
2. Government programs  
 Support payments are based on yield.  
 Government program discourage diversification in crop production.  
 Restrictions placed on set aside acres.
3. Farm Structure  
 Tenant-Landowner. Tenant must maintain crop base.  
 Social philosophical impediments - lot of baggage with organic farming.  
 Negative feelings about "trash" farming.  
 Fear of change or taking a risk.  
 Labor availability?  
 Marketing opportunities - LISA is producer driven, organic farmers are market driven.
4. Criticism of Proponents of LISA  
 Expect change to fast, change occurs slowly.  
 "Tendency to preach to the choir"  
 Too much emphasis on economics
5. Issues related to economics  
 Not enough data on economics of LISA.  
 Too much emphasis of short term economics rather than long term economics.  
 Changes must mean something to the farmer (eg. wildlife).

**B. Tony Calvalaira - talk about current agriculture infrastructure**

What would happen if pesticides and fertilizer were cut off.  
 75% of our population has no appreciation of farming.  
 Legislation that may inhibit or harm farming is possible.  
 LISA does not really mean to reduce inputs but to change inputs eg. reduce herbicide and hire people to hoe weeds.  
 Substitute manure for synthetic nitrogen.  
 Farming practices varies tremendously within and between areas.  
 All farmers cannot manage both livestock and crops.  
 No good data on stability of production under various systems.  
 Most farmers are using some LISA farming techniques.  
 More diesel energy used with LISA due to increased tillage.  
 Farm equipment will build what will sell but they need 2-3 years of lead time.  
 Chemical companies have been effective in developing material that require lower use rates.  
 Any across the board cut in inputs would affect industry but they could respond to

new needs of the farmers.

Need to substitute gene for insect resistance in the seed industry rather than depend upon insecticides.

Banking, irrigation, biological products, fertilizer companies, chemical companies, etc. would all be affected by LISA.

LISA would help soil testing, scouting, computer companies, crop consultants, biotech industries, host resistance, seed companies, etc.

People need to work together to avoid unnecessary conflict or regulation.

Land grant AES should be able to respond quicker than the farmers. However, there is not much money to do research for LISA programs.

### C. Clark Youngberg - Education

Expecting farmers to accept too much too soon. Need an attitude adjustment period.

We may be in an era of adjustment in agriculture.

People resist sudden change.

On farm research may help people believe the ES is believable, but there is resistance to change.

3C's - commitment to learn, capability and confidence.

Need more reliable information for the ES.

Decision making is a more personal thing.

Audience you need to reach: Public school children (elementary grades). How does one reach absentee landlords, policy makers and politicians, what medium is the best?, whole farm family.

Need reliable information, i.e. consumers have drastically changed the amount of meat they eat.

Recent Ph.D. said he did not learn or hear about LISA in his training program.

Money is a great way to get cooperative programs going.

Maybe our present methods are good and we will provide the education that is needed.

Goal of education in LISA is not clear.

Relationship between research and education: ES has been too conservative at extending information.

Extension has always required a good research base for their information and they should not change this for LISA.

In the final analysis the farmer is the best teacher.

Seattle and Philadelphia have no pesticide advertisements on TV and these urbanites have a greater fear of pesticides. That is why chemical companies advertise on TV. 6% of viewers are opposed to pesticides because of these advertisements on prime time TV. TV does work or the companies would not use it.

### D. William Lockeretz - Policy issues of LISA, Public Policy

Working for LISA is desirable, but much disagreement to this assumption was expressed.

Support for LISA must mean support for the family farm or much support will be lost.

Goal should be support for the environment and LISA should be used to accomplish that goal.

If we shift to LISA will this mean a dependable and secure food supply? Many though the answer was no.

LISA will not provide a cheap food supply.

Barriers to implementing or adoption of LISA

1. Farmers change slowly.
2. Uncertainty about the economic impact of LISA.
3. Do not know the macro economic impact of LISA.
4. Inadequate economic information on LISA.



5. Government programs generally discourage LISA adoption (not all though).

Agriculture was being made too much of a whipping boy in the area of environmental concerns.

We should return to normal crop acreage rather than base acreage. This will allow for greater diversification in cropping and agricultural production.

Should all crop payment programs be eliminated or should they be recoupled to LISA programs. Much of our government farm programs are not buying a low of natural resource protection.

Would the group be willing to shift funds to support research on LISA? (No consensus on this was reached).

At the federal level LISA was already dead and it will be incorporated into water quality. The basis for this statement was that it was not in the President's budget but congress will put it back into the budget.

You can farm the government by conventional or LISA farming programs.

### **John Ibred - A Search for Sustainability and Profitability**

Lower Input System - Systems which rely less on external purchased inputs and more on internal resources.

Present systems - Balanced farming (30 years ago) with a computer.

Does LISA mean going back? We must reexamine old technology.

- a. Trend toward specialization
- b. Old concept but examine them with new technology (computers, etc.)

Why consider diversification?

- a. Rising costs of specialization
- b. Potential gains from integration
  - 1) Synergism, Synergism and synthesis has major benefits.
  - 2) Risk Diversification. Mega trends affect commodity prices and thus diversification is good for farmers.
- c. Threat to regulation. We must make needed changes or government will try to regulate us towards those changes.
- d. Non-profit notification. This drives some farmers as they have concerns beyond economics.

### **Economics of Sustainability**

1. Economics means allocation of scarce resources. How do we use our resources to accomplish what we want or desire?

### **New Paradigms**

1. Sustainable profits rather than maximum profits.
2. Profit as a constraint.
3. Multiple objective functions. All these concerns are important (economics, environment, etc.) so design a crop production program that includes all these concerns.

### **Profit maximization**

Profit max. lbs of N = 180 pounds

Conventional. Inherent in the soil 20 and 160 lbs external

Lower input Inherent 20, Internal (manure or legume) 50, External 110 lbs.

We need to assess the cost of the internal N source to determine if the use of manure or a legume is profitable.

### **New Paradigms**

1. Emerging concept - resource risks
  - a. Comparative advantage and gains from trade
  - b. Risks of dependence on external inputs

c. Resource risks versus specialization

Borrowed capital is an external input and the risk of borrowing eliminated many farmers in the 1970's.

Nowadays we might have some farmers too dependent upon certain pesticides and when these pesticides are lost some farmers might also be lost (same as borrowing too much money).

We don't need to eliminate all external inputs but individual farmers should not becoming too dependent.

Economists are realists and people don't like realists, but we must be willing to look at our external and internal inputs.

Advocates of LISA must be willing to look at economic facts just like conventional farmers must look at internal and external inputs.

**Norman Berg - Where to from Here?**

People are questioning the sustainability of modern agriculture.

Concerns about human health and environmental concerns of modern agriculture.

Many national conferences on sustainable farming and this emphasis continues to increase.

The only sustainable agriculture is profitable agriculture.

How can we determine if our present agriculture is sustainable?

How did we get to where we are? Is conventional agriculture non-sustainable?

Where are we going in U.S. agriculture if we are to conserve our soil plus protect our water and wildlife?

Agriculture use of pesticides has tripled since 1954. (5 billion by 1990).

\$35 Billion are still lost to pests each year.

U.S. agriculture has demonstrated its ability to produce.

Agriculture chemical use is not just a rural problem as they are used in all sectors of society.

**Transition suggestion**

1. Encourage present LISA farmers
2. Examine legislation dealing with LISA, water quality, etc.
3. How do we involve more than the research and extension people?
4. Lets recognize the site specific characteristic of farms.
5. Respond to requests for articles, interviews, etc.
6. Be able or get prepared to offer options for LISA farmers.
7. Lets use the organizations already in place.
8. Monitor the outcome of change systems. What will be a credible evaluation?

75% of farmers feel they have a low or inadequate knowledge of LISA farming systems. We need an agriculture that is sustainable, profitable, and environmentally conscious.